Klamath River Salmon Disease Workshop
January 31–February 1, 2007

The National Marine Fisheries Service sponsored the third annual Klamath River Fish Health Conference in cooperation with US Fish and Wildlife and US Geological Survey. The conference provided a forum for the exchange of current information on fish disease in the Klamath River. The information primarily focused on research related to the critical disease outbreaks that have caused significant mortality in juvenile salmon in the Klamath River downstream of Iron Gate Dam. Scientists from agencies and universities presented the preliminary results of their research conducted in 2006. One-hundred-and-twenty attendees, including scientists, managers, tribal representatives, fishermen and academics participated in the two-day conference. Local media in northern California covered the conference well with favorable reports in press and television.

Presentations focused on the disease pathogens, *Ceratomyxa shasta* (C. shasta), *Parvicapsula minibicornis* (Parvicapsula), and their intermediate host, the polychaete worm, *Manayunkia speciosa*. During the protracted drought of 2001 through 2005, infection rates of C. Shasta and Parvicapsula in juvenile outmigrant salmon were extremely high (80-90%). While the high rates of infection in past years likely resulted in higher than natural rates of juvenile mortality, the resulting population effect of this mortality is not understood at this time.

In 2006, as a result of heavy precipitation and snowpack, the Klamath River experienced high winter and spring flows. Researchers and scientists hypothesized that high flows would improve disease conditions by disturbing the habitat of the polychaete worm and by diluting the number of spores during juvenile salmon outmigration. Research indicates the rates of infection in 2006 were low during the peak outmigration of juvenile Chinook salmon (March, April), then increased in May. The 2006 results showed that the peak of infection was delayed by about one month when compared with recent dry water years. This research suggests that the disease-related mortality of outmigrating juvenile salmon in 2006 was lower than in past years.

Possible management measures to address Klamath River fish disease issues were discussed by panels of fish health experts and resource agency representatives. Flow alterations were discussed as the primary management tool. For example, flow increases in spring could dilute the concentrations of spores and augment outmigration of juvenile salmon through the high risk areas of the mainstem Klamath River. The health and consequent ability of the juvenile salmon to resist infections would benefit as well from increased flows. The panels also discussed the approach of combating fish disease by disturbing the habitat of the polychaete worm. For example, gravel augmentation below Iron Gate Dam and flow variation were discussed as potential tools that could alter the preferred habitat of the worm, thereby disturbing the life cycle of the disease pathogens. Currently, the use of flow alteration at Iron Gate Dam as a management tool is limited due to court mandated minimum flows. Fish health researchers and scientists expressed an interest in meeting in the near future to further develop options for management to consider.

The participants in the conference universally expressed concern that fish health research and monitoring will continue to be funded in the near future on a piecemeal basis and that funds for this upcoming season were uncertain. To address this concern, USGS presented an integrated strategic plan for Klamath River fish health research and monitoring. The estimated cost of the research and monitoring is $2 million annually for 10 years ($20M total). Currently, this is not an official proposal by USGS nor is it funded from any source.

The Klamath River Fish Health Conference was successful in bringing together agencies, tribes, stakeholders, and the public, and providing a forum for sharing information on fish health issues of the Klamath River Basin. The conference will likely remain an annual event, convening again in the winter of 2008.